DOCUMENT RESUME

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DESCRIPTORS	Creative Thinking; *Critical Thinking; *Earth Science; Elementary Education; *Science Activities; Science Instruction; Scientific Methodology; Space Sciences

ABSTRACT

Based on a hypothetical situation that aliens have invaded Earth and humans must relocate to another planet, students design a shelter that can be built on another planet to insure their survival. Students research the characteristics of a planet of their choice and consider how to get to that planet from Earth, determine which five items that they will take along, and why they chose those items. This activity uses a time frame of 100 minutes. (Author/SOE)

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Activity: **Space Shelter**

GRADE LEVELS: 3-5

SUMMARY:

The invasion has taken place and it is time that we need to find a new home. To insure your survival past earth's occupation you must design a shelter that can be built on another planet. Students will research the characteristics of a planet of their choice. They will design a shelter that will allow them to survive on a new planet, and explain it in words.

LEVEL OF DIFFICULTY [1 = Least Difficult : 5 = Most Difficult]

3- Average

TIME REQUIRED

100 minutes (2 or 3 class periods)

COST

None

STANDARDS:

1.1 Identify materials used to accomplish a design task based on a specific property (i.e. weight, strength, hardness, and flexibility).

2.1 Identify a problem that reflects the need for shelter, storage or convenience.

2.2 Describe different ways in which a problem can be represented (e.g. sketches, diagrams, graphic organizers, and lists).

2.3 Identify relevant design features (e.g. size, shape, weight) for building a prototype of a solution to a given problem.

WHAT WILL THE STUDENTS LEARN?

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SE060019

Research skills, planets, application of research results, design techniques, presentation skills.

BACKGROUND INFORMATION:

This lesson should coincide with a unit on the solar system.

RESOURCES:

http://www.jsc.nasa.gov/pao/factsheets/factsheets/9508001.html -Living conditions in space.

http://kids.msfc.nasa.gov/Rockets/Living.asp - about astronauts living in space on the shuttle

http://science.nasa.gov/LivingInSpace.htm -living in space

http://www.pbs.org/spacestation/station/living.htm -more on living in space, requirements, etc.

http://www.childrensmuseum.org/cosmicquest/spacestation/teacher.html - activity to build a space station

http://www.biozone.co.uk/SPACE_BIOLOGY.html - look at "Living in Space" section and links with it

http://www.biospheres.com/ - Biospheres and cool stuff about them

http://www.space.edu/projects/book/chapter31.html -The human body in outer space

MATERIALS:

library books

internet access (optional)

Microsoft Powerpoint (optional)

papers

pens

markers

PREPARATION:

Assign or allow students to choose planets to research.

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DIRECTIONS:

Earth has just been invaded by aliens, and humans must relocate to another planet. To insure your survival past earths occupation you must design a shelter that can be built on another planet. You will also have to consider how to get to your choice planet from earth, and five items that you will take and why you choose them.

1. Pick a planet that you would like to move to after earth is invaded. Research this planet and find out information about the new environment in which you will live. Some things to think about for survival are climate, atmosphere composition, surface composition, day length, distance from the sun, force of gravity etc. (see Space Shelter Research Guide)
2. Design an ideal shelter that would allow you to survive on the new planet. Explain the characteristics of your house including materials used and special design features. (You may need to design new materials to survive the harsh enviroments of other planets.)
3. Present your design to the class (this could be done in PowerPoint).

The basis of the presentation should be the design and the feasibility of human survival (this will decrease the redundancy of presentations if several students pick the same planet). Use the Space Shelter Research Guide for other information that can be covered.

4. A good homework extension. Once you have designed your shelter consider what five items you would take with you and why. Have the student write a journal entry.

INVESTIGATING QUESTIONS:

Why did you choose that planet?

What features of your design will help you to survive on your planet?

Why do people not live on that planet now?

Where is a good place to find information about planets?

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REFERENCES:

none

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Rubric for Performance Assessment

Activity Title: Space Shelter

Grade Level: 3-5

Criteria	1 Developing	2 Proficient	3 Advanced	Weight (X factor)	Subtotal
Presentation	Did not include all facts. Disorganized.	Good information but lacks 1 quality of advanced presentation.	All facts are presented in a clear manner and are well organized.		
Design	Poor, does not ensure survival.	Design shows good research and survival is likely.	Design shows careful research of planet and original thought in design.		
Research Skills	Incomplete collection of information.	All necessary information found through research.	All necessary information found and more. Went beyond expectations.		
				Total:	

Teacher Comments

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Name:_____

SPACE SHELTER RESEARCH HANDOUT:

Name of planet:

Distance from Earth:

Distance from Sun:

Day length:

Percentage of oxygen in atmosphere:

Strength of gravity:

Climate:

Surface composition:

Any other facts you need to know to survive:

How will you get to the new planet from earth?

What 5 things will you take with you and why?

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PreK-12 ENGINEERING

Activity Evaluation Form

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Activity Name: _____

Grade Level the Activity was implemented at:_____

Was this Activity effective at this grade level (if so, why, and if not, why not)?

What were the Activity's strong points?

What were its weak points?

Was the suggested Time Required sufficient (if not, which aspects of the Activity took shorter or longer than expected)?

Was the supposed Cost accurate (if not, what were some factors that contributed to either lower or higher costs)?

Do you think that the Activity sufficiently represented the listed MA Framework Standards (if not, do you have suggestions that might improve the Activity's relevance)?

Was the suggested Preparation sufficient in raising the students' initial familiarity with the Activity's topic (if not, do you have suggestions of steps that might be added here)?

If there were any attached Rubrics or Worksheets, were they effective (if not, do you have suggestions for their improvement)?

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I. DOCUMENT IDENTIFICATION:

Title: PreK-12 Engineering Activities

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2) Invent a Backscratcher from Everyday Materials, Grades PreK-2
http://www.prek-12engineering.org/data/d28/Backscratcher.pdf

3) Compare Human-Made Objects with Natural Objects, Grades PreK-5
http://www.prek-12engineering.org/data/d34/HumanvsNatural.pdf

4) Do Different Colors Absorb Heat Better?, Grades PreK-2
http://www.prek-12engineering.org/data/d37/Absorbheat.pdf

5) Which Roof is Tops?, Grades PreK-2
http://www.prek-12engineering.org/data/d44/RoofTops.pdf

6) Make Your Own Recycled Paper, Grades PreK-2
http://www.prek-12engineering.org/data/d56/Recycle.pdf

7) Build an Approximate Scale Model of an Object Using LEGOs, Grades 3-5
http://www.prek-12engineering.org/data/d3/LegoScaleModel.pdf

8) Design Weather Instruments using Lego Sensors, Grades 3-5
http://www.prek-12engineering.org/data/d4/LegoWeather.pdf

9) Space Shelter, Grades 3-5
http://www.prek-12engineering.org/data/d5/SpaceShelter.pdf

10) Build a Bird House, Grades 3-5
http://www.prek-12engineering.org/data/d6/BirdHouse.pdf

11) Ball Bounce Experiment, Grades 3-5
http://www.prek-12engineering.org/data/d6/BallBounce.pdf

12) Make an Alarm!, Grades 3-5
http://www.prek-12engineering.org/data/d11/MakeAlarm.pdf

13) Design Packing to Safely Mail Raw Spaghetti, Grades 3-5
http://www.prek-12engineering.org/data/d17/MailSpaghetti.pdf

14) Disassemble a Click Pen, Grades 3-5
http://www.prek-12engineering.org/data/d33/clickPen.pdf

15) Construct And Test Roofs for Different Climates, Grades 3-5
http://www.prek-12engineering.org/data/d35/ClimateRoof.pdf

16) Compare Fabric Materials, Grades 3-5
http://www.prek-12engineering.org/data/d36/Fabric.pdf

17) A House is a House for Me, Grades 3-5
http://www.prek-12engineering.org/data/d52/House.pdf

18) Water Filtration, Grades 3-5
http://www.prek-12engineering.org/data/d53/Water Filtration.pdf

19) What is the Best Insulator: Air, Styrofoam, Foil, or Cotton?, Grades 3-5
http://www.prek-12engineering.org/data/d54/BestInsulator.pdf

20) Design a Recycling Game!, Grades 3-5
http://www.prek-12engineering.org/data/d55/Recycling.pdf

21) Tower Investigation and the Egg, Grades 6-8
http://www.prek-12engineering.org/data/d7/TowerEgg.pdf

22) Wimpy Radar Antenna!, Grades 6-8
http://www.prek-12engineering.org/data/d10/WimpyAntenna.pdf

23) Portable Sundial, Grades 6-8
http://www.prek-12engineering.org/data/d30/PortableSundial.pdf

24) An Introduction To Loads Acting on Structures, Grades 6-8
http://www.prek-12engineering.org/data/d31/IntroLoads.pdf

25) Design Your Own Rube Goldberg Machine, Grades 6-8
http://www.prek-12engineering.org/data/d32/RubeGoldberg.pdf

26) Building Tetrahedral Kites, Grades 6-8
http://www.prek-12engineering.org/data/d38/tetrakites.pdf

27) Do as the Romans: Construct an Aqueduct!, Grades 6-8
http://www.prek-12engineering.org/data/d39/Aqueduct.pdf

28) Build an Earthquake City!!, Grades 6-8
http://www.prek-12engineering.org/data/d40/EarthquakeCity.pdf

29) Design a Parachute, Grades 6-8
http://www.prek-12engineering.org/data/d41/Parachute.pdf

30) The Squeeze is On, Grades 6-8
http://www.prek-12engineering.org/data/d42/Squeeze.pdf

31) Stop The Stretching, Grades 6-8
http://www.prek-12engineering.org/data/d43/StopStretching.pdf

32) Speaker Project, Grades 9-10
http://www.prek-12engineering.org/data/d13/Speaker.pdf

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